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**SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)**

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (R), DECEMBER 2023****COMPUTER SCIENCE AND ENGINEERING****(2020 SCHEME)****Course Code : 20CST401****Course Name: Artificial Intelligence****Max. Marks : 100****Duration: 3 Hours****PART A*****(Answer all questions. Each question carries 3 marks)***

1. Define Agent. Mention the four rules of an AI Agent.
2. State the concept of rationality.
3. Differentiate Uninformed Search and Informed Search strategies.
4. Can you formulate why heuristic search techniques are considered to be powerful than the traditional search techniques?
5. Define the term arc consistency
6. Create a partial game tree for the game of tic-tac-toe.
7. List the syntactic elements of First Order Logic
8. Define resolution in first order logic. Write the steps for resolution.
9. Define entropy
10. State Occam's razor principle. Illustrate its necessity in learning hypothesis.

**PART B*****(Answer one full question from each module, each question carries 14 marks)*****MODULE I**

11. a) List and explain about Foundations of Artificial Intelligence. (6)  
b) Explain with a diagram Model-based reflex agents and Goal-based reflex agents (8)

**OR**

12. a) Briefly explain the different types of environments in AI (8)  
b) Give the PEAS description for the following agents (6)
  - a) Automated taxi driver
  - b) Tennis player
  - c) Playing Soccer

**MODULE II**

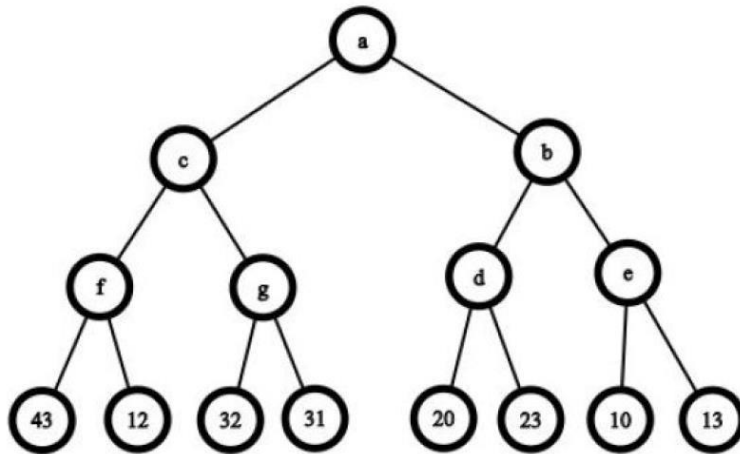
13. a) Explain A\* search algorithm and its optimality conditions (10)  
b) Explain why problem formulation must follow goal formulation (4)

**OR**

14. a) Explain Uniformed Cost Search algorithm. Illustrate the working with an example (8)
- b) Evaluate the performance of problem solving method based on (6)
- i) Breadth First strategy
  - ii) Depth first search algorithm

**MODULE III**

15. a) Explain MiniMax algorithm. What is the values of the root node after Minimax search over the given tree?

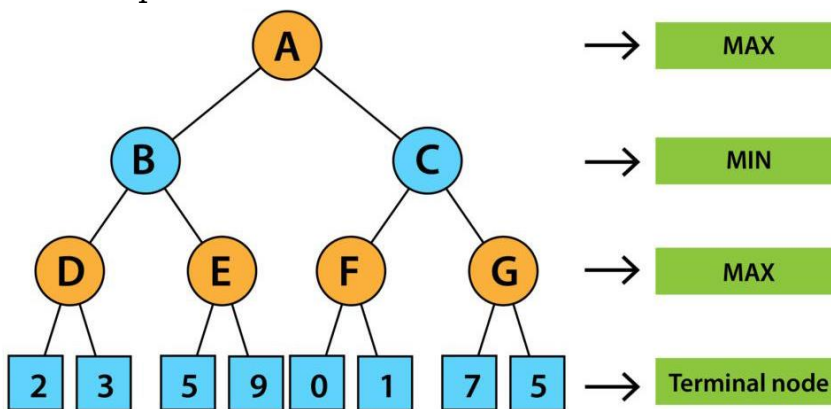


(9)

- b) Using Constraint Satisfaction algorithm solve the following Crypt Arithmetic problem BASE + BALL = GAMES (5)

**OR**

16. a) Consider the following tree. Perform alpha beta pruning and find the optimal solution.



(4)

- b) Explain back tracking in CSP with an example (10)

**MODULE IV**

17. a) Distinguish between Predicate Logic versus Propositional Logic (6)
- b) Explain Backward chaining with an example. (8)

**OR**

18. a) Apply Resolution for the following facts  
a. John likes all kind of food.  
b. Apple and vegetable are food  
c. Anything anyone eats and not killed is food. (10)  
d. Anil eats peanuts and still alive  
e. Harry eats everything that Anil eats. Prove by resolution that:  
f. John likes peanuts.
- b) Evaluate the generalized modus ponens rule. (4)

**MODULE V**

19. a) Explain Univariate Linear Regression and Multivariate Linear Regression. (10)  
b) Explain Inductive Learning (4)

**OR**

20. a) Illustrate the ways to detect overfitting and explain the ways to prevent overfitting (8)  
b) Explain various forms of learning with examples. (6)

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